Ultra High-Speed Imaging

Completed Technology Project (2015 - 2016)

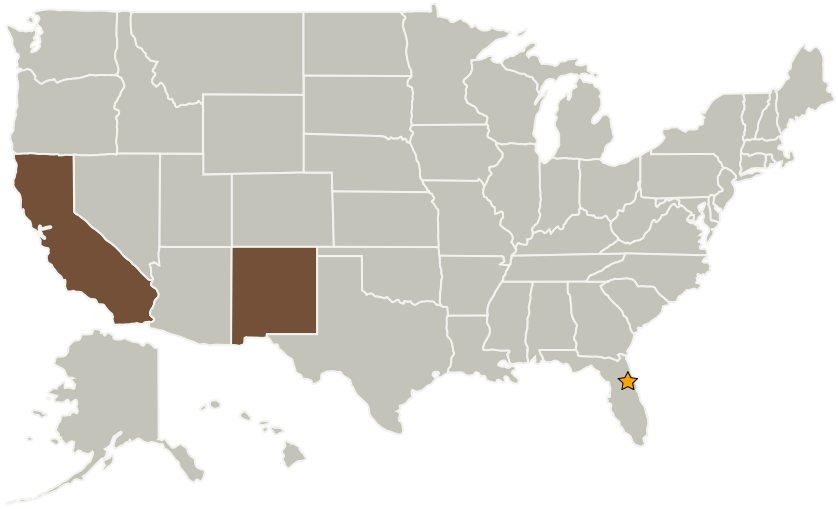
Project Introduction

Goal 1: Discrete diodes - State-of-the-art: P-type dopant (boron) creates >500nm dead layer near surface; Pixels sensitive to x-rays above ~1KeV; Superlattice doping Superlattice < 5nm thick, enables nearly 100% charge collection efficiency; Pixels sensitive to entire X-ray spectrum. Goal 2: Hybridized CMOS Imagers - State-of-the-art: Sandia is developing ultrahigh speed detectors using DBI bonding for back-illumination Superlattice doping; Integrate JPL's superlattice doping processes with Sandia's DBI-bonded imaging arrays. Demonstrate stable surface passivation with improved sensitivity to low energy X-rays and electron.

Anticipated Benefits

Imaging with very short exposure times enables new science in biomedicine, nanotechnology, and space research; High Energy Density Physics; Time resolved imaging and spectroscopy; 3D camera based on pulsed illumination and time-resolved detection; Fluorescence lifetime imaging microscopy (FLIM) for image guided surgery.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Center Innovation Fund: KSC CIF

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Organizations Performing Work	Role	Type	Location
★Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Sandia National Laboratories(SNL)	Supporting Organization	R&D Center	Albuquerque, New Mexico

Primary U.S. Work Locations	
California	New Mexico

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Project Management

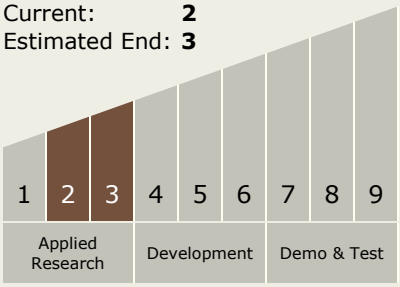
Program Director:
Michael R Lapointe

Program Manager:
Barbara L Brown

Principal Investigator:
Michael E Hoenk

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **3**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes